

At page 3, lines 8-19:

B 1
The present invention is directed to a garment having one or more garment openings for the wearer's waist, legs, arms, and the like. For example, the garment may be a diaper, training pant, feminine hygiene article, swim wear, absorbent underpant, protective gown, protective cap, protective glove, protective drape, protective face mask, or the like. The garment has elastic properties at the opening achieved without the use of a separately manufactured, separately attached elastic band, and is easier and less expensive to manufacture than a conventional garment having one or more elastic bands at the opening.

The garment of the invention is manufactured using a targeted elastic material ("TEM") having a targeted elastic zone aligned with the garment opening or openings. The TEM may have a substantially homogeneous appearance, and does not have a separately manufactured elastic band attached to it. Yet the TEM has different elastic properties at different regions, and exhibits greater elastic tension in a region aligned with, and in the vicinity of, at least one garment opening. In one embodiment, for example, the TEM may include one or more high tension zones aligned with one or more of the garment openings, and one or more low tension zones away from the openings. The high tension zone(s) can include one set of elastomeric filaments while the low tension zone(s) can include a different set of elastomeric filaments. The elastomeric filaments in the high tension zone may have different average filament sizes and/or densities than the elastomeric filaments in the low tension zone. In another embodiment, the elastomeric filaments in the high tension zone may include a different elastomeric polymer composition than the elastomeric filaments in the low tension zone.

At page 4, line 10 - page 5, line 20:

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Fig. 1 illustrates a perspective view of a pant-like absorbent garment in accordance with the invention, having targeted elastic regions aligned with, and in the vicinity of garment openings;

Fig. 2 illustrates another embodiment of a pant-like absorbent garment of the invention;

Fig. 3 is a plan view of the garment shown in Fig. 1, showing the side facing away from the wearer;

Fig. 4 is a plan view of the garment shown in Fig. 1, showing the side facing the wearer when the article is worn, and with portions cut away to show the underlying features;

Figs. 5-8 illustrate representative targeted elastic laminate ("TEL") materials useful for making the garments of the invention;

Figs. 9-12 illustrate representative processes for making TEL materials useful for making garments of the invention;

B² Fig. 13A shows one exemplary adhesive spray pattern in which the adhesive has been applied to the elastic filaments with attenuation in the cross direction;

Fig. 13B shows a second exemplary adhesive spray pattern;

Fig. 13C illustrates a third exemplary adhesive spray pattern;

Fig. 13D shows an exemplary bond angle in one exemplary adhesive spray pattern;

Fig. 14 illustrates the bonding pattern and method of calculating the number of bonds per unit length on elastic strands or filaments;

Fig. 15A shows a fourth exemplary adhesive spray pattern in a swirled-type of configuration;

Fig. 15B shows a fifth exemplary adhesive spray pattern that is more randomized and which provides a large percentage of adhesive lines in a perpendicular orientation to the elastic filaments;

Fig. 15C illustrates a sixth exemplary adhesive spray pattern having attenuation of adhesive lines in the cross-machine direction;

Fig. 15D shows a seventh exemplary adhesive spray pattern that resembles a "chain-link fence"; and

Fig. 16 is a schematic view of another process for making TEL materials useful for making garments of the invention.

At page 17, lines 7-20:

B3
The flap elastic members 53, the waist elastic members 54 and 56, and the leg elastic members 58 can be formed of any suitable elastic material, such as the targeted elastic material of the invention or separately manufactured and separately attached elastic materials. As is well known to those skilled in the art, suitable elastic materials include sheets, strands or ribbons of natural rubber, synthetic rubber, or thermoplastic elastomeric polymers. The elastic materials can be stretched and adhered to a substrate, adhered to a gathered substrate, or adhered to a substrate and then elasticized or shrunk, for example with the application of heat; such that elastic constrictive forces are imparted to the substrate. In one particular embodiment, for example, the leg elastic members 58 comprise a plurality of dry-spun coalesced multifilament spandex elastomeric threads sold under the trade name LYCRA and available from E. I. Du Pont de Nemours and Company, Wilmington, Delaware, U.S.A., and other components of the garment, such as the side panels 55, comprise the targeted elastic material of the invention.

At page 24, line 20 - page 25, line 11:

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In TEL 100, low tension zone 102 may have a first elastic tension, measured at 50% elongation of the filaments, and high tension zones 104 and 106 may have second and third elastic tensions higher than the first tension, measured at the same elongation. At 50% elongation of the TEL 100 (in the machine direction, parallel to filament orientation), high tension zones 104 and 106 may have an elastic tension at least 10% greater, suitably at least 50% greater, desirably 100-800% greater, alternatively about 125-500% greater, or as another alternative 150-300% greater than the low tension zone 102. Elastic tension may be measured, for instance, using an MTS SINTEC Model 1/s, sold by MTS in Research Triangle Park, North Carolina, with a crosshead speed set to 500 mm/min. Samples having a 3-inch width and 6-inch length can be used, with 3 inches of the length clamped inside the jaws (leaving 3 inches of length for testing). The tension of each high and low tension region can be measured after the portion of the TEL laminate being tested is held in the extended condition (in the machine direction of the TEL) for 60 seconds.

At page 27, lines 1-13:

B5
Materials suitable for use in preparing elastomeric filaments 108 and 109 in the low and high tension zones 102, 104 and 106, include diblock, triblock, tetrablock or other multi-block elastomeric copolymers such as olefinic copolymers, including styrene-isoprene-styrene, styrene-butadiene-styrene, styrene-ethylene/butylene-styrene, or styrene-ethylene/propylene-styrene, which may be obtained from the Shell Chemical Company, under the trade designation KRATON elastomeric resin; polyurethanes, including those available from B. F. Goodrich Co., under the trade name ESTANE; polyamides, including polyether block amides available from Ato Chemical Company, under the trade name PEBAX polyether block amide; polyesters, such as those available from E. I. Du Pont de Nemours Co., under the trade name HYTREL polyester; and single-site or metallocene-catalyzed polyolefins having density less than about 0.89 grams/cc, available from Dow Chemical Co. under the trade name AFFINITY.

At page 28, lines 3-8:

B6
Suitable block copolymers useful in this invention include at least two substantially polystyrene endblock portions and at least one substantially ethylene/butylene mid-block portion. A commercially available example of such a linear block copolymer is available from the Shell Chemical Company under the trade designation KRATON G1657 elastomeric resin. Another suitable elastomer is KRATON G2740.

At page 28, line 21 - page 29, line 11:

B7
Commercial production of single-site catalyzed polymers is somewhat limited but growing. Such polymers are available from Exxon Chemical Company of Baytown, Texas under the trade name EXXPOL for polypropylene based polymers and EXACT for polyethylene based polymers. Dow Chemical Company of Midland, Michigan has polymers commercially available under the name ENGAGE. These materials are believed to be produced using non-stereo selective single-site catalysts.

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CONT

Exxon generally refers to their single-site catalyst technology as metallocene catalysts, while Dow refers to theirs as "constrained geometry" catalysts under the name INSITE to distinguish them from traditional Ziegler-Natta catalysts which have multiple reaction sites. Other manufacturers such as Fina Oil, BASF, Amoco, Hoechst and Mobil are active in this area and it is believed that the availability of polymers produced according to this technology will grow substantially in the next decade.

At page 36, line 18 - page 37, line 5:

B8

As explained above, nonwoven layer 308 can be produced either a) directly from spinnerette 330, which is configured to yield zones of higher and lower elastic tension similar to Figs. 3-7, or b) through the combined effect of spinnerette 330 as a uniform or nonuniform die, and secondary spinnerettes 336 which increase the elastic tension in localized regions of layer 308 by extruding secondary filaments 316 onto layer 306, similar to the web in Fig. 8. In either case, the nonwoven layer 308 (including filaments 312 and 316) may be incrementally stretched and, to an extent, maintained in alignment by moving the foraminous conveyor 340 in a clockwise machine direction, at a velocity which is slightly greater than the exit velocity of the filaments leaving the die.

At page 42, line 21 - page 43, line 9:

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To make the higher tension region, a vertical filament die 230 extrudes higher tension (i.e., higher basis weight) elastic filaments 316 in a band which is narrower than the laminate 307 containing filaments 312. Filaments 316 pass around a chill roll 245, or a series of chill rolls, and a series of stretch rolls, for example three stretch rolls 255, 256, 257, before being joined with laminate 307 between nip rolls 356 and 358, which are suitably smooth or patterned calender rolls. Simultaneously, facing layers 360 and 362 are unwound from supply rolls 364 and 366 and joined with the laminate between nip rolls 356 and 358 to make TEL 370. As TEL 370 is relaxed, it may assume the puckered configuration shown, due to retraction of high tension